WE CLAIM:

1. A composition, comprising:

a first layer comprising a material having a high power factor; and

a second layer comprising a diffusion barrier.

2. The composition according to claim 1 where the material having a high power factor has a formula $Bi_xSb_{2-x}Se_yTe_{3-y}$, or $PbSe_zTe_{1-z}$ where $0 \leq x \leq 2$, $0 \leq y \leq 3$, and $0 \leq z \leq 1$.

3. The composition according to claim 1 where the diffusion barrier comprises a material having a formula ASe_zTe_{2-z}, where A is selected from the group consisting of Ti, Zr, Hf, V, Nb, Ta, Cr, Mo, W, and combinations thereof, and $0 \leq z \leq 2$.

4. The composition according to claim 1 where the first layer comprises at least one of Bi_2Te_3, Sb_2Te_3, Bi_2Se_3, Sb_2Se_3, $TiTe_2$, $HfTe_2$, $ZrTe_2$, PbTe, $TiSe_2$, $HfSe_2$, $ZrSe_2$, PbSe, alloys thereof, and combinations thereof.

5. The composition according to claim 1 where the first layer and the second layer are repeating layers forming a superlattice.

6. The composition according to claim 1 where the first layer and the second layer form a repeating unit.

7. The composition according to claim 5 where the first repeating layer comprises Bi_2Te_3.

8. The composition according to claim 1 where the first layer includes Bi_2Te_3, and the second layer includes $TiTe_2$.

9. The composition according to claim 5 where the first repeating layer comprises Sb_2Te_3.

10. The composition according to claim 5 where the second repeating layer comprises $HfTe_2$, $TiTe_2$, or both.

11. The composition according to claim 5 further comprising a third repeating layer.

12. The composition according to claim 11 where the third repeating layer comprises a material having a formula $Bi_xSb_{2-x}Se_yTe_{3-y}$, or $PbSe_zTe_{1-z}$ where $0 \leq x \leq 2$, $0 \leq y \leq 3$, and $0 \leq z \leq 1$.

13. The composition according to claim 11 further comprising a fourth repeating layer.

14. The composition according to claim 13 where the fourth repeating layer comprises a diffusion barrier material.

15. The composition according to claim 13 where the fourth repeating layer comprises a material having a formula ASe_zTe_{2-z}, where A is selected from the group consisting of Ti, Zr, Hf, V, Nb, Ta, Cr, Mo, W, and combinations thereof, and $0 \leq z \leq 2$.

16. The composition according to claim 11 where each layer is from about 3 to about 200 Å thick

17. The composition according to claim 13 where the first, second, third and fourth layers comprise a repeating unit.

18. The composition according to claim 13 where the first layer comprises Bi_2Te_3.

19. The composition according to claim 13 where the second layer comprises $TiTe_2$.

20. The composition according to claim 6 where the repeating unit is from about 6 to about 500 Å thick.

21. The composition according to claim 6 where the repeating unit is from about 40 to about 100 Å thick.

22. The composition according to claim 11 comprising Bi_2Te_3, $TiTe_2$, and Sb_2Te_3.

23. The superlattice according to claim 13 where the second and fourth layers comprise a material having a formula ASe_zTe_{2-z}, where A is selected from the group consisting of Ti, Zr, Hf, V, Nb, Ta, Cr, Mo, W, and combinations thereof, and $0 \leq z \leq 2$.

24. The composition according to claim 23 where each layer of the repeating unit comprises at least one of Bi_2Te_3, $TiTe_2$, and Sb_2Te_3.

25. The composition according to claim 17 comprising a repeating unit having a first layer including Bi_2Te_3, a second layer including $TiTe_2$, a third layer including Sb_2Te_3, and a fourth layer including $TiTe_2$.

26. A method for making a thermoelectric superlattice, comprising:

synthesizing a first material, the first material having a formula $Bi_xSb_{2-x}Se_yTe_{3-y}$, or $PbSe_zTe_{1-z}$ where $0 \leq x \leq 2$, $0 \leq y \leq 3$, and $0 \leq z \leq 1$; and

synthesizing a second material on the first material, the second material being a diffusion barrier.

27. The method according to claim 26 where the second material has the formula ASe_zTe_{2-z}, where A is selected from the group consisting of Ti, Zr, Hf, V, Nb, Ta, Cr, Mo, W, and combinations thereof, and $0 \leq z \leq 2$.

28. The method according to claim 26 where the first material is synthesized by MER.

29. The method according to claim 26 further comprising synthesizing a third material, the third material having a formula $Bi_xSb_{2-x}Se_yTe_{3-y}$, or $PbSe_zTe_{1-z}$ where $0 \leq x \leq 2$, $0 \leq y \leq 3$, and $0 \leq z \leq 1$.

30. The method according to claim 26 where the second material is synthesized by MER.

31. The method according to claim 29 further comprising synthesizing a fourth material, the fourth material being a diffusion barrier.

32. The method according to claim 26 where the first material and the second material are synthesized as a repeating unit.